



## Richmond River Ecological Health Program

# Report Card Autumn 2023

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**Southern Cross  
University**



*Richmond*  
**RIVERKEEPER**



**River Ecology  
Australia**

ASSESSMENT, EDUCATION, RESTORATION

## Richmond River Ecological Health Program

Sampling riparian condition, water quality and river health using macroinvertebrates the Richmond River Ecological Health Program was created to provide publicly available ongoing riparian and ecological river health information for the Richmond River and its waterways and catchment. Thanks to funding by a Southern Cross University VC Flood Recovery Grant, and support from the Richmond Riverkeeper Association and River Ecology Australia. The first sampling campaign was completed in May 2023.

A major component of the program is examining the type and number of macroinvertebrates (water bugs) collected. This can tell us a lot about how healthy or unhealthy a river is because different macroinvertebrates have varying sensitivity to pollution. Some macroinvertebrates will survive pretty much anywhere others require the most pristine waters. Monitoring macroinvertebrates over time can help assess the effectiveness of restoration efforts. Improvement in macroinvertebrate diversity and abundance indicates positive changes in water quality and river habitat conditions. This feedback helps guide future restoration actions and adaptive management strategies.

By integrating data on macroinvertebrates, water quality, and riparian condition, the Richmond River Ecological Health Program provides a holistic picture of river health. This approach allows for a better understanding of the interrelationships between different factors influencing the health of rivers within the Richmond River Catchment. It provides a more accurate assessment and helps identify specific causes and impacts of any observed changes in macroinvertebrate populations. Putting the power in the communities' hands, with ongoing support creates a drive from within the community to improve our rivers. The Richmond River Ecological Health Program will be community led with The Richmond Riverkeepers Association managing the ongoing program.



## Citizen Scientists

The invaluable contribution of our citizen scientists cannot be overstated. These dedicated individuals have gone above and beyond to collect river health data from waterways in the catchment. Through their efforts, we have been able to gain a comprehensive understanding of the state of our rivers. Their passion for environmental stewardship and commitment to scientific research have made a significant impact on our understanding of river health. Their data collection efforts have not only provided us with a snapshot of the current conditions but have also allowed us to track changes and identify trends over time. The achievements of our citizen scientists are a testament to their dedication and exemplifies the vital role that communities play in contributing to scientific knowledge. Their contributions are truly commendable, and we extend our sincere gratitude for their ongoing efforts in enriching our understanding of the Richmond River catchment's streams, rivers, and riparian ecosystem.

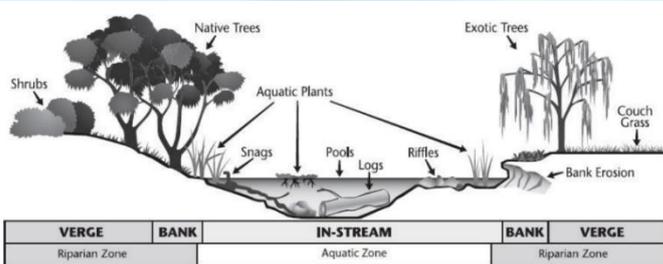
## Spotlight on a macroinvertebrate: Net Spinning Caddis

This caddisfly larva from the family Hydropsychidae is known as the "net-spinning caddis". It creates a net out of silk from its mouth and uses it to capture its food which are small particles like leaf detritus and even animal parts from the water column, each silk thread is arranged in such a way to create mesh webbing that stretches and balloons with food in the water's current. It has also been found that they act as an ecosystem engineer in streams by increasing the stability of benthic substrates during flooding.



## Science Snapshot: Riparian Zones

Riparian zones refer to the areas of land along the banks of rivers and streams. These zones are transitional spaces between aquatic environments and terrestrial ecosystems. Riparian zones are characterized by specific vegetation, including trees, shrubs, and other plants that are adapted to grow in the unique conditions found near water sources. Riparian vegetation helps to stabilise river and stream banks, provide shade, regulate water temperature, and offer an array of ecological benefits to both the aquatic and terrestrial ecosystems. They serve as important interfaces where water and land interact, influencing the overall health and functioning of river systems.



Source: Waterwatch Field Manual (NSW)

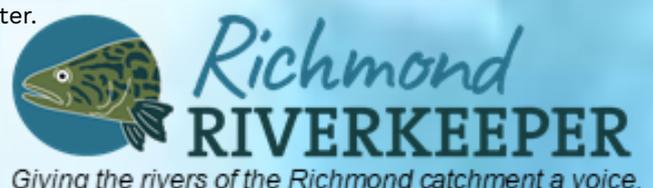
## Richmond Riverkeeper Association

The Richmond Riverkeeper Association respects and celebrates the unique relationship of Indigenous peoples to the land and waterways of the Richmond River catchment. Joining with Riverkeepers across the globe we have a vision for the rivers of the Richmond River catchment to be healthy once more. Our mission is to fulfil community aspirations to improve the waters of the Richmond River catchment, so they are drinkable, swimmable, and fishable again. For us this means committed partnerships that focus on habitat restoration, enhancing riverbank stability, reduce the loss of our precious soils and reduce pollutant loads. Improvements like these create the conditions to bring back species like the iconic Eastern Freshwater Cod.

The Richmond Riverkeeper Association acknowledges that the lands and waterways of the Richmond Catchment and beyond, are the unceded territories of the peoples of the Bundjalung and Githabul Nations. We pay our respect to their Ancestors, who cared for Country since time began, and to all communities of the Bundjalung and Githabul Nations, and to all Traditional Custodians, who continue to speak and care for their Country and Water.

**FIND US AT** [www.richmondriver.org.au](http://www.richmondriver.org.au)

Photos By Brendan Cox

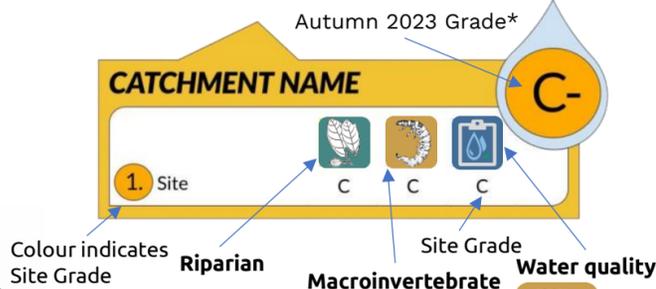


# Ecological Health Grades

## Grading System

Grade	
A+ to B	Good
B- to C	Fair
C- to D	Poor
D- to E	Very Poor

## Interpreting the Scorecard



## Map Key

- Land Use**
- Cropping/Horticulture
  - Developed Land
  - Forest
  - Pasture
- Boundaries**
- Administrative Boundaries
  - Catchment Boundaries

## Riparian Condition



Condition of riparian zone vegetation based on assessment of the structure of riparian vegetation, weeds, and habitat. This parameter considers stream-bed morphology, erosion, and vegetation composition.

## Macroinvertebrates



Direct observation and measurement of macroinvertebrates is an important indicator of overall ecological condition of streams and rivers. This parameter considers quantity and diversity of macroinvertebrate species.

## Water Quality



The chemical and physical condition of water can influence what biotic life exists in aquatic systems. This parameter incorporates measurements of biological activity and reactivity that influence macroinvertebrate diversity and pollution resistance.

## UPPER RICHMOND RIVER

**C**

Site	Riparian	Macroinvertebrate	Water quality
1. Roseberry Creek A	C	B	C
2. Roseberry Creek B	D	B	D
3. Lynche's Creek	C	C	C
4. Richmond River	D	C	D

## WILSON'S RIVER

**C-**

Site	Riparian	Macroinvertebrate	Water quality
1. Webster's Creek A	B	B	C
2. Webster's Creek B	D	C	D
3. Tibirian Creek	A	C	B
4. Rocky Creek	D	NA	D
5. Wilson's River	E	NA	E

## NORTH CREEK

**C-**

Site	Riparian	Macroinvertebrate	Water quality
1. Maguires Creek	C	B	C
2. Emigrant Creek	C	D	E

## KYOGLE

## LISMORE

## BYRON

## BALLINA

## RICHMOND VALLEY

## LOWER RICHMOND RIVER

**C-**

Site	Riparian	Macroinvertebrate	Water quality
1. Tucki Tucki Creek	C	C	C
2. Richmond River*	C	D	D

## BUNGAWALBIN CREEK

**C+**

Site	Riparian	Macroinvertebrate	Water quality
1. Bungawalbin Creek*	B	D	D
2. Myrtle Creek*	C	D	D

The Richmond River catchment is in the Northern Rivers Region of NSW



**C-**

## OVERALL SCORE FOR THE RICHMOND RIVER CATCHMENT AUTUMN 2023

\* For catchments without data from 2023, the most recent available data was used: Darren Ryder, Armidale: Aquatic Ecology & Restoration Research Group, Nov. 2015 Armidale, NSW: Aquatic Ecology



## State of the Catchment

The overall ecological health grade of C- from the data collected in the first round of sampling for the Richmond River Ecological Health Program in Autumn 2023 reflects the recent extreme conditions (significant flooding events in February 2022) and historical land management and use of the Richmond River catchment. Results indicate that the lower catchment sites tend to have poorer water quality and low macroinvertebrate diversity. However, even for our upper catchment sites, where the water quality is better, macroinvertebrate diversity is still quite low. This indicates that aquatic habitat is compromised throughout the catchment, including in the upper reaches. Aquatic habitat can be impacted by reduced riparian vegetation, which in turn increases the risk of sediment entering our water ways. Widespread landslides occurred throughout the upper catchment because of the 2022 floods, and this sediment load may have a significant legacy impact on aquatic health in the Richmond River catchment into the future. The ecological health grades decline further down the catchment. The low ecological health grades in the lower catchment are likely due to a combination of reduced riparian condition as well as urban and agricultural nutrient and sediment inputs.

Across the catchment our citizen scientists observed poor bank condition (e.g., bank slumping, exposed tree roots and undercutting), and poor bed condition (active erosion and smothering of the bed substrate by high loads of fine sediment). This is reflected in the lower-than-expected macroinvertebrate grades, especially in the Upper Richmond and Wilsons catchments, which indicates that the upper catchments are suffering from impacted aquatic habitat. This is likely due to high sedimentation from legacy land clearing and landslides following the 2022 flooding. Reduced riparian vegetation increases the risk of sediment entering our water ways. High levels of sedimentation can smother aquatic habitats and reduce the availability of food resources for macroinvertebrates. This can lead to a decline in the number and type of macroinvertebrates in areas impacted by sedimentation.

Lower macroinvertebrate and water quality grades were also likely associated with nutrient enrichment which can negatively affect macroinvertebrate species that are sensitive to high nutrient levels. These species may have specific habitat requirements or be adapted to low-nutrient conditions. In nutrient-rich environments usually in agricultural and urban areas, sensitive species may decline or become less abundant. As macroinvertebrates are an important food source for higher trophic levels (e.g., fish, birds, platypus, turtles), the low abundance of macroinvertebrates may have impacts across the food web.

While this first set of data collected in Autumn is valuable for establishing a baseline assessment and identifying immediate issues, our continued sampling every six months will improve data accuracy, enables trend analysis, and it will allow for a more comprehensive understanding of river health and facilitates effective management of our rivers in the long run.

## Health of the Richmond River Estuary

In the lower estuary of the Richmond River, numerous programs are underway to assess and monitor water quality over time. For instance, Rous County Council in partnership with the NSW Department of Planning and Environment and Southern Cross University have installed a system of water quality data loggers in the lower Richmond River.

These permanent monitoring sites measure pH, salinity, temperature, dissolved oxygen, and turbidity.

Results from the data loggers are available at this [water quality dashboard](#) and shown on the [summary map](#).

## Interested in Contributing?

**Join the Richmond Riverkeeper Association:** [www.richmondriver.org.au](http://www.richmondriver.org.au).

**For more information contact:** [Brendan.cox@scu.edu.au](mailto:Brendan.cox@scu.edu.au)

## Acknowledgement and thanks

The Richmond River Ecological Health Program would not exist without these amazing citizen science groups:

Whian Whian Landcare - Rocky Creek

Websters Creek Landcare - Webster Creek, Blue Knob & Stoney Chute

Monaltrie Landcare – Wilsons River

Githabul Rangers – Richmond River, Roseberry

The Living School – Tucki Tucki Creek, Goonellabah

Tibarian Creek, Goonengerry

Southern Cross University Science Students – Emigrant Creek, Tintenbar

Border Rangers Richmond Valley Landcare Network -

Upper & Lower Roseberry Creek,

Upper & Lower Lynches Creek,

Back Creek

Bulwinkle Park Landcare – Maguires Creek, Alstonville

## What next

Our citizen scientists will visit their sites in mid-November to conduct the next round of sampling. We are also working on creating an interactive map that will be available at [richmndriver.org](http://richmndriver.org) so anyone can access the results at any time and see changes over time.

We are pleased to welcome 11 new groups thanks to funding and support from the NSW Department of Planning and Environments [Flood Recovery Water Quality Monitoring Project](#). This takes the program to 22 citizen scientist groups monitoring 39 sites across the Richmond River Catchment

## New Groups

Upper Gradys Creek Watch – Gradys Creek (3 site)

JP Bush Regeneration – Boomerang creek & Topsy creek, Rosebank (2 sites)

Wilsons River Headwaters – Upper Wilsons & Coopers Creek (2 sites)

EnVite/ Boat Harbour Landcare – Wilsons River., Boat Harbour (1 site)

Ngulingah Rangers – Goolmangar creek, Nimbin (1 site)

TBC - Iron Pot Creek, Tun

Jali – Tuckean Swamp Ballina (1 site)

Jagun Alliance – Richmond River, Between Kyogle and Casino (1 site)

TBC - Myrtle Creek, Rappville

South Lismore Duck Pond Landcare – Leycester Creek, Lismore (1 site)

Richmond River High School – Wilsons River, Lismore (1 site)

Jiggi Creek River Watchers – Jiggi Creek, Jiggi (2 Sites)